UI Bulletin #119

Subject: Info - Radio Telephone/Mobile Radio (Transceiver) Installation and Troubleshooting Guidelines

Models Affected: All GM Passenger Cars and Trucks

Model Years: 2000 and beyond

Date: August 14, 2014

Revision Date: August 14, 2014

This UI Bulletin is being created using information contained in General Motors Technical Service Bulletin 04-08-46-002

The following information is being provided to assist in the installation and troubleshooting of radio telephone/mobile radios.

Certain radio telephones or land mobile radios also known as radio transceivers), or the way in which they are installed, may adversely affect various vehicle operations such as engine performance, driver information, entertainment and electrical systems.

Expenses incurred to protect the vehicle systems from any adverse effects of any such installation are not the responsibility of General Motors Corporation.

The following are general guidelines for installing a radio transceiver in General Motors vehicles. These guidelines are intended to supplement, but not to be used in place of, detailed instructions which are the sole responsibility of the manufacturer of the involved radio transceiver. Although this document refers to passenger vehicles, the same general guidelines apply to trucks.

Important: Refer to the illustrations found later in this bulletin for aid in installation.

- Transceiver Location
  - Locate transceiver for remote radios on driver's side of trunk as near to the vehicle body side as possible.
  - One piece transceivers should be mounted under the dash or on transmission hump where they will not interfere with vehicle controls or passenger movement.
  - Great care should be taken not to mount any transceivers, microphones, speakers or any other item in the deployment path of a Supplemental Inflatable Restraint (air bag).

Disclaimer: GM Upfitter Integration Technical Bulletins are intended for use by professional technicians, NOT a "do-it-yourselfer". They are written to inform these technicians of conditions that may occur on some vehicles, or to provide information that could assist in the proper service and/or modification of a vehicle. These properly trained technicians have the equipment, tools, safety instructions, and know-how to do a job properly and safely. If a condition is described, DO NOT assume that the bulletin applies to your vehicle, or that your vehicle will have that condition. Contact GM Upfitter Integration for information on whether the information is applicable your vehicle.

- Antenna Installation
  - Each vehicle model and body style reacts to radio frequency energy differently. When dealing with an unfamiliar vehicle, it is suggested that a magnetic-mount antenna be used to check the proposed antenna location for unwanted effects on the vehicle. Antenna location is a major factor in these effects.
  - The antenna should be a permanent-mount type located in the center of the roof or center of the rear deck lid. Glass mounted antennas should be kept as high as possible in the center of the rear window or windshield. If a magnet-mount antenna is used, care should be taken to mount the antenna in the same location as a permanent-mount type. If a disguise-mount antenna is used, great care should be taken to shield any tuning network from vehicle electronics and wiring, or to mount the tuning network in an area completely clear of vehicle electronics and wiring.
  - Standard metal mount antennas may be mounted on a vehicle with nonmetallic body panels by two methods. Most nonmetallic skinned vehicles have metal frames underneath. Mounting the antenna near a metal frame section and bonding the antenna mount to the frame with a short metal strap will provide the ground plane connection. Some antenna manufacturers offer “ground plane kits” that consist of self-adhesive metal foil that may be attached to the body panel to provide the ground plane for the antenna.
  - Some vehicles use glass that contains a thin metallic layer for defrosting or to control solar gain. Glass mount antennas will NOT function when mounted on this type of glass.
  - If RF-related interactions occur when using a hitch or bumper-mount HF antenna on a vehicle that has body on frame construction (i.e. pickup, SUV) connect a ground strap from the vehicle frame to the bottom rear of the vehicle body (for station wagon type vehicles), or from the vehicle frame to the bottom rear of the cab (pickup style vehicles).
- Antenna Cable Routing
  - Always use a high quality coax (at least 95% shield coverage) located away from the engine control module (ECM) and other electronic modules.
  - Care should be taken to maintain as great a distance as possible between any vehicle wiring and the feed line.
- Antenna Tuning

  It is important that the antenna be tuned properly and reflected power be kept to less than 10% (VSWR less than 2:1).

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- Radio Wiring and Connection Locations
  - Connecting radio power on General Motors vehicles is model dependent. The installer must decide which one of the following four methods will be appropriate.
    - Connect the positive and negative leads directly to the battery terminals (illustrated in this guideline).
    - Connect the positive lead to the auxiliary power terminal (located at the under hood fuse center or identified by a red plastic cover in the under hood area) and connect the negative lead directly to the negative battery terminal.
    - Connect the positive lead to the auxiliary power terminal and connect the negative lead to the battery body connection point (identified by a short #10 AWG or larger wire running from the negative battery terminal to the body of the vehicle).
    - Connect the positive and negative leads to the Special Equipment Option (SEO) wiring provided for this purpose.
  - If connections are made directly to the battery terminals, the GM-approved methods of connecting auxiliary wiring include the adapter package illustrated in Figure 2, NAPA-Belden replacement battery bolts, P/N 728198, or drilling and tapping the hex end of the original battery bolts 10-32 X 3/8" deep. Note that it is recommended that a fuse be placed in the transceiver negative lead to prevent possible transceiver damage in the event the battery-to-engine block ground lead is inadvertently disconnected.
  - For ONE-PIECE TRANSCEIVERS where ignition switch control is desired and no SEO wiring exists, a 12 volt power contactor must be installed in the transceiver positive lead. The contactor should be located near a proper 12 volt feed. The coil of the contactor should be connected through an appropriate in-line fuse to an available accessory circuit or ignition circuit not powered during cranking. The contactor coil must return to a proper negative point. The detailed view in Figure 1B illustrates direct connection to the vehicle battery.
  - Any negative lead from a handset or control unit must return to a proper negative connection point. It is preferable that the positive lead for a handset or control unit be connected directly to a proper positive feed. If ignition switch control is desired, the handset or control unit positive lead may be connected through an appropriate in-line fuse to an available accessory circuit or ignition circuit not powered during cranking. It is recommended that the handset or control unit positive and negative leads be appropriately fused separately from the transceiver positive and negative leads.
  - If multiple transceivers or receivers are to be installed in the vehicle, power leads to the trunk or under dash should be connected to covered, insulated terminal strips. All transceivers or receivers may then have their power leads connected to the strips. This makes a neater installation and reduces the number of wires running to the vehicle under hood area.

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Radio Wire Routing

  - The power leads should be brought through a grommet hole in the front bulkhead that must be provided by the installer. For trunk-mounted transceivers, the cables should continue on along the driver's side door sills, under the rear seat, and into the trunk through the rear bulkhead. All attempts should be made to maintain as great a distance as possible between radio power leads and vehicle electronic modules and wiring.
  - If the battery is located on the passenger side, radio power leads should cross the vehicle in front of the engine.
- Troubleshooting
  - Should vehicle-radio interaction develop following installation, the source of the problem should be determined prior to further operation of the vehicle. Most interaction problems can be eliminated by following the installation guidelines.
  - If any vehicle-radio interaction problems exist after following these guidelines, refer to the EMC Troubleshooting Chart at the end of this bulletin.

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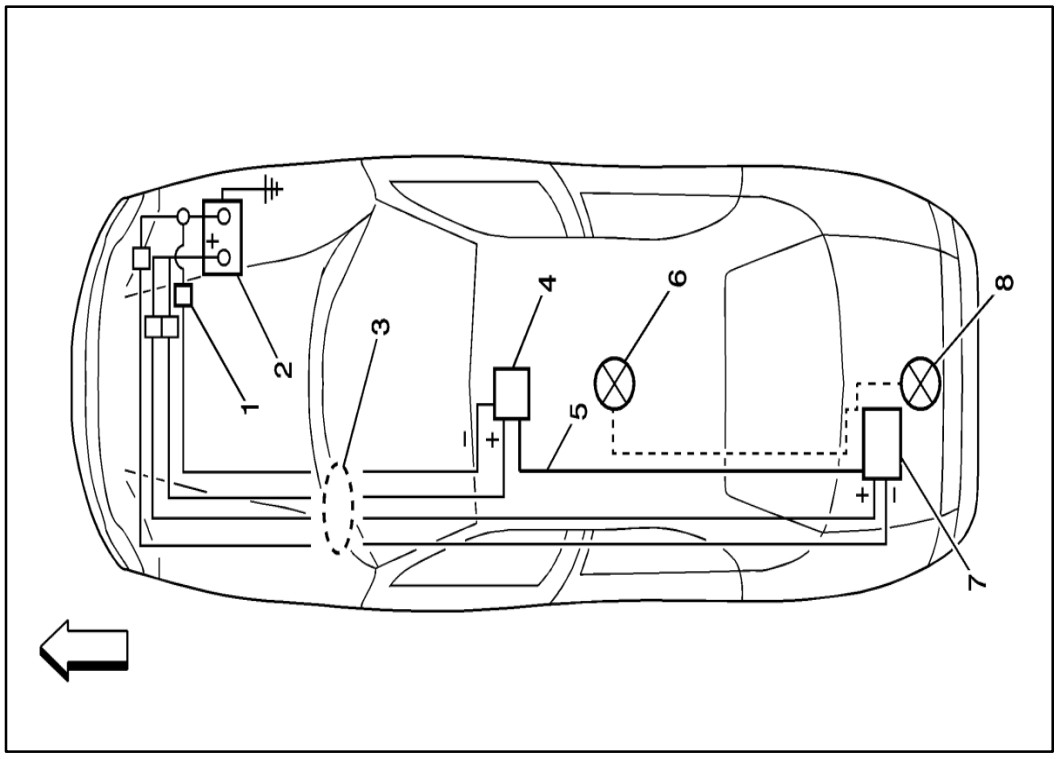
Figure 1A — Transceiver Installation – Example of Remote Mounted Transceiver



(1)	Fuses
(2)	Battery
(3)	Grommet Installed in Bulkhead and Separate from Other Vehicle Wires
(4)	Control Head
(5)	Control Cable
(6)	Roof Antenna Location
(7)	Transceiver
(8)	Rear Deck Antenna Location

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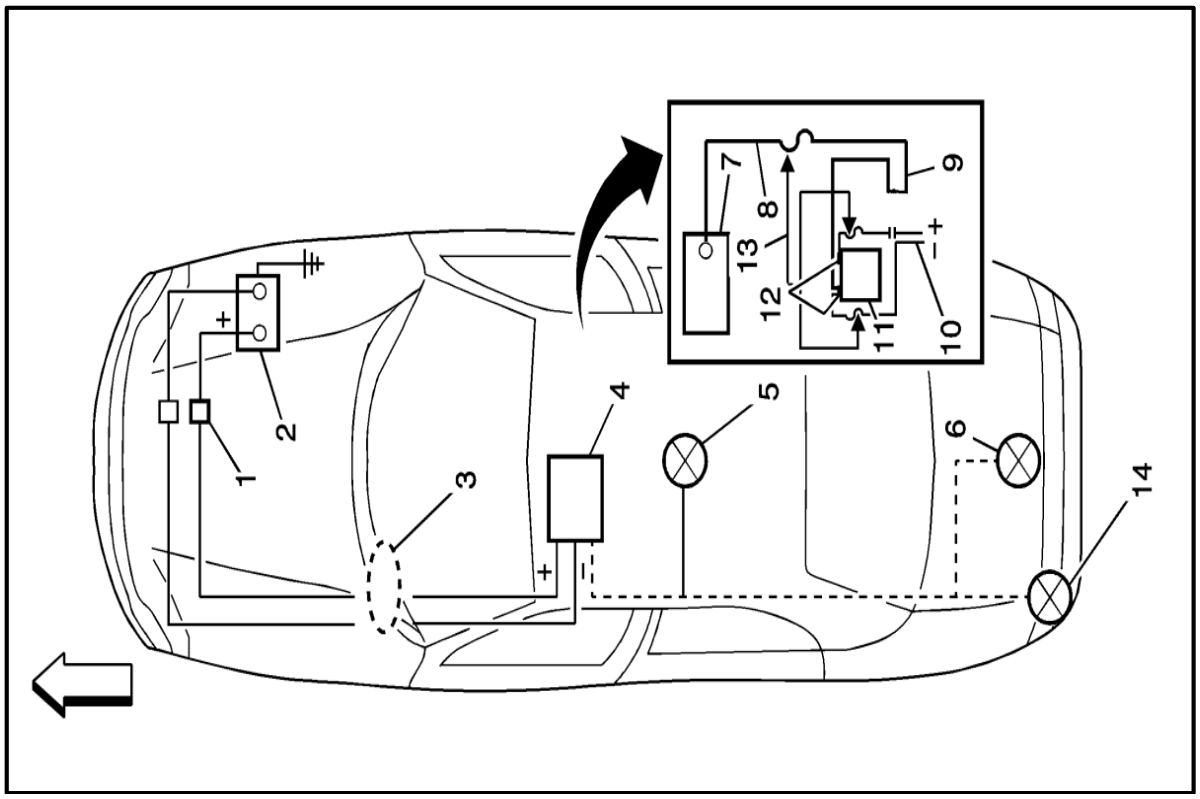
Figure 1B — Transceiver Installation – Example of One Piece Transceiver



(1)	Fuses
(2)	Battery
(3)	Grommet Installed in Bulkhead and Separate from Other Vehicle Wires
(4)	Coax Cable
(5)	Roof Antenna Location
(6)	Rear Deck Antenna Location
(7)	Fuse Block
(8)	To Contactor Coil
(9)	12V Power Contactor
(10)	To Transceiver
(11)	Vehicle Battery
(12)	Fuses
(13)	Accessory or Ignition Circuit
(14)	Bumper Mount Location for Amateur Applications

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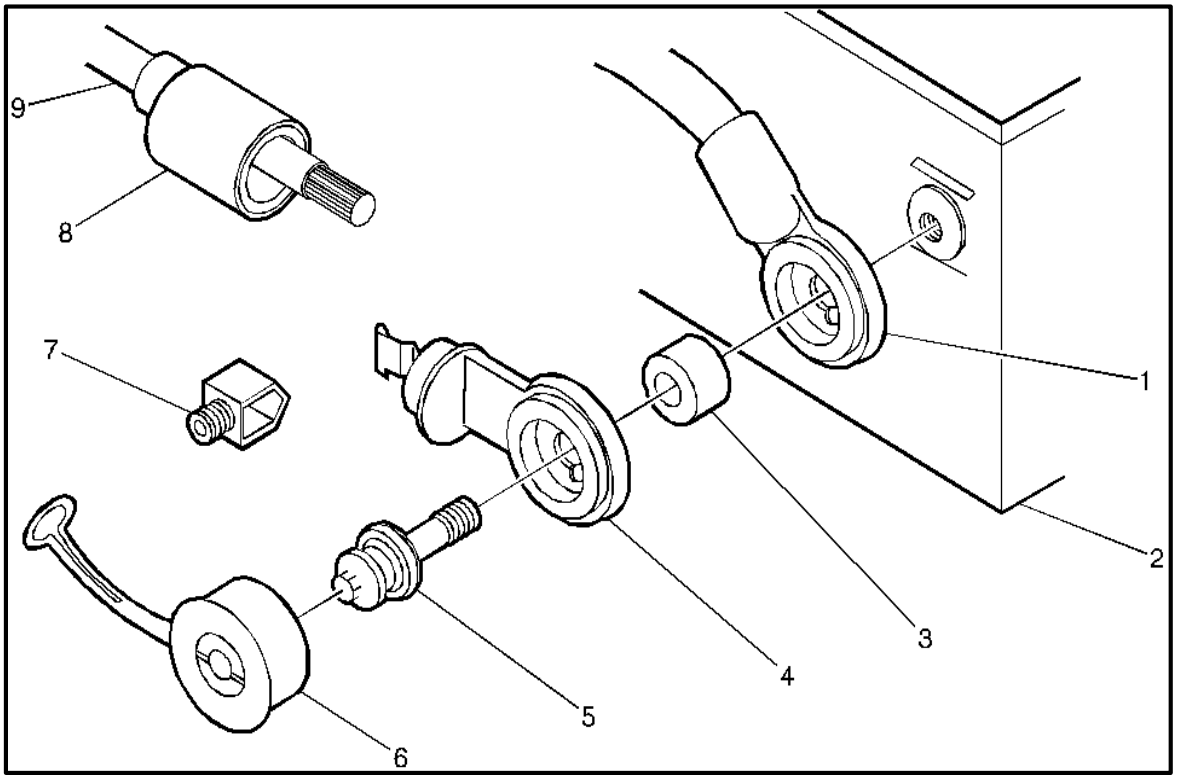
Figure 2 — Auxiliary Electrical Equipment – GM Recommended Installation



1) Vehicle Battery Cable	(2) Vehicle Battery
(3) Contact Spacer	(4) Adapter Terminal (part of kit 1846855)
(5) Long Battery Terminal Bolt	(6) Terminal Cover (part of kit 1846855)
(7) Wire Connector (part of kit 1846855)	(8) Insulation Boot (part of kit 1846855)
(9) Auxiliary Equipment Cable(s)	

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EMC Troubleshooting Chart				
Step		**Action**	**Yes**	**No**
1		Can you reproduce the concern?	Go to Step 2	Must be able to reproduce the concern.
2		Is the vehicle equipped with aftermarket accessories such a radar detectors, remote starters, radio transceivers, etc.	Go to Step 3	Go to Step 6
3		Remove or disable the accessories. Is the concern related to the operation of such accessories?	Go to Step 4	Go to Step 6
4		Check for ground points and correct cable routing and antenna location. Does the installation conform to GM guidelines?	Go to Step 6	Go to Step 5
5		Correct the installation. Is the concern eliminated?	Concern resolved	Go to Step 6
6		Gather the following information: • The radio frequencies involved • Engine ON or OFF • Is the concern intermittent Does a Service Bulletin or P.I. exist dealing with this concern?	Go to Step 7	Go to Step 8
7		Perform the procedure from the service bulletin or P.I. Is the concern eliminated?	Concern resolved	Go to Step 8
8		Identify additional EMC parameters. Is the accessory defective?	Go to Step 9	Go to Step 10
9		Repair/replace the component. Is the concern eliminated?	Concern resolved	Go to Step 10
10		Inspect the circuit integrity for the following: • Ground connections • Connector integrity	Go to Step 12	Go to Step 11

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EMC Troubleshooting Chart				
Step		**Action**	**Yes**	**No**
		• Cable routing Is the circuitry acceptable?		
11		Repair the circuitry as needed. Is the concern eliminated?	Concern resolved	Go to Step 12
12		Consult with Technical Assistance for any additional available information.		

Parts Information

AC-Delco Side Terminal Adapter Package 1846855, when combined with the longer battery bolt and spacer will provide the simple, light, corrosion-resistant connection illustrated.

Description	AC-Delco Catalog 7A10	Car Dealer Parts Book
Kit	1846855	1846855
Bolt	7803	12004188
Spacer	7804	12004189

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